

APPENDIX A

Criteria for Confirmation of Etiologic Agents

Table 9A. Criteria for confirmation of bacterial agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
<i>Bacillus cereus</i>	A. Vomiting type 2-4 hours (1-6 hours) B. Diarrheal type 12 hours (4-16 hours)	A. Vomiting, nausea, occasional diarrhea (Heat-stable enterotoxin) B. Diarrhea (watery), abdominal cramps (Heat-labile enterotoxin)	A. Boiled or fried rice B. Custards, sauces, meat loaf, cereal products, refried beans, dried potatoes
<i>Campylobacter jejuni</i>	2-5 days (1-10 days)	Abdominal cramps (often severe), diarrhea, bloody diarrhea, fever, headache	Poultry, unpasteurized milk, water, raw clams
<i>Clostridium botulinum</i>	12-48 hours (2 hours -8 days)	Acute bilateral cranial nerve impairment and descending weakness or paralysis; usually preceded by blurred or double vision, difficulty swallowing, dry mouth, vomiting and constipation	Canned low-acid foods, smoked fish, cooked potatoes, marine mammals
<i>Clostridium perfringens</i>	10-12 hours (6-24 hours)	Diarrhea (watery), colic, nausea and gas (Vomiting and fever are uncommon and symptoms usually resolve within 24 hours).	Inadequately heated or reheated meats, meat pies, stews, gravy, sauces, refried beans
<i>Escherichia coli</i> (Enteroinvasive or Enterotoxigenic)	10-12 hours (Heat-stable toxin) 10-12 hours (Heat-labile toxin)	Profuse watery diarrhea without blood or mucus, abdominal cramping, vomiting, low-grade fever and dehydration	A. Uncooked vegetables, salads, water
<i>E. coli</i> 0157:H7 (Enterohemorrhagic)	48-96 hours (up to 10 days)	Bloody or non-bloody diarrhea, severe abdominal cramps and occasional vomiting; fever infrequent	B. Undercooked ground beef and beef, raw milk, soft cheese, water
<i>Salmonella</i> spp. (Non-typhoid)	18-36 hours (12-72 hours)	Acute enterocolitis, diarrhea, fever, nausea, abdominal cramps, headache, occasional vomiting.	Poultry, egg products, meat, unpasteurized milk
<i>Salmonella typhi</i>	3 days - 3 months (1-3 weeks)	Insidious onset of fever, headache, malaise, constipation or diarrhea, anorexia	Fecally contaminated foods such as shellfish, raw fruits, and water
<i>Shigella</i>	24-72 hours (12-96 hours)	Diarrhea, fever, nausea, vomiting, tenesmus, severe abdominal cramping	Fecally contaminated foods such as salads, cut fruit and water
<i>Staphylococcus aureus</i>	2-4 hours (1-8 hours)	Sudden onset of severe abdominal cramps, nausea, vomiting, diarrhea, chills, headache, weakness, dizziness	Ham, meat & poultry, cream filled pastries, custard, high protein leftover foods
<i>Vibrio cholerae</i> 01 or 0139 <i>Vibrio cholerae</i> non-01	24-72 hours (few hours - 5 days)	Sudden onset of profuse watery diarrhea, rapid dehydration, vomiting Watery diarrhea, vomiting	Raw fish or shellfish, crustacea, water, fecally contaminated foods
<i>Vibrio parahaemolyticus</i>	12-24 hours (4-96 hours)	Watery diarrhea, abdominal cramps, nausea, vomiting, fever, headache	Marine fish, shellfish, crustacea (raw or contaminated)
<i>Vibrio vulnificus</i>	24-48 hours	Fever, nausea, abdominal cramps and muscle aches; often leads to septicemia in immunocompromised persons	raw oysters

Table 9B. Criteria for confirmation of bacterial agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	WSLH Kit #
<i>Bacillus cereus</i>	Isolation of 10^6 <i>B. cereus</i> /gm of implicated food, OR Isolation of <i>B. cereus</i> from stool of ill person.	5-50 g stool	Kit # 10
<i>Campylobacter jejuni</i>	Isolation of <i>C. jejuni</i> from implicated food, OR Isolation of <i>C. jejuni</i> from stool or blood of ill person.	15 ml stool	Kit # 10
<i>Clostridium botulinum</i>	Detection of <i>C. botulinum</i> toxin from implicated food, OR Detection of <i>C. botulinum</i> toxin from human sera, or feces, OR Isolation of <i>C. botulinum</i> from stool of persons with clinical syndrome, OR Consistent clinical syndrome in persons known to have eaten same food as persons with laboratory proven cases.	25-50 g stool	sterile, leak-proof container
<i>Clostridium perfringens</i>	Isolation of $>10^5$ <i>C. perfringens</i> /gm of implicated food, OR Isolation of <i>C. perfringens</i> in stool of ill persons, OR Detection of enterotoxin by latex agglutination (from stool extracts of culture isolates).	5-50 g stool	Kit # 10
<i>Escherichia coli</i> (Enteroinvasive or Enterotoxigenic)	Demonstration of <i>E. coli</i> of same serotype in implicated food and stools in persons, OR Isolation of <i>E. coli</i> of the same serotype shown to be enteroinvasive or enterotoxigenic from stool of ill persons, OR	15 ml stool	Kit # 10
<i>E. coli</i> 0157:H7 (Enterohemorrhagic)	Demonstration of <i>E. coli</i> isolates from stools that are enterotoxigenic or enterohemorrhagic.		
<i>Salmonella</i> spp. (Non-typhoid)	Isolation of <i>Salmonella</i> from implicated food or water, OR Isolation of <i>Salmonella</i> from stool from ill persons.	15 ml stool	Kit # 10
<i>Salmonella typhi</i>	Isolation of <i>S. typhi</i> from blood, stool or other clinical specimens.	15 ml stool	Kit # 10
<i>Shigella</i>	Isolation of <i>Shigella</i> from implicated food, OR Isolation of <i>Shigella</i> from stool of ill persons.	15 ml stool	Kit # 10
<i>Staphylococcus aureus</i>	Isolation of an enterotoxin producing strain of <i>S. aureus</i> in implicated food, OR Isolation of enterotoxin producing strain of <i>S. aureus</i> from stool of ill persons	5-50 g stool	Kit # 10
<i>Vibrio cholerae</i> 01 or 0139	Isolation of toxigenic <i>V. cholerae</i> 01 or 0139 from implicated food, OR Isolation of <i>V. cholerae</i> 01 or 0139 from stool or vomitus of ill persons, OR Significant rise (fourfold) in vibriocidal antibodies.	15 ml stool	Kit # 10
<i>Vibrio cholerae</i> non-01	Isolation of <i>V. cholerae</i> non-01 from stool of ill person. Isolation of <i>V. cholerae</i> non-01 from implicated food is supportive evidence.		
<i>Vibrio parahaemolyticus</i>	Isolation of 10^5 /g <i>V. parahaemolyticus</i> from implicated food (usually seafood), OR Isolation of <i>V. parahaemolyticus</i> from stool of ill persons.	15 ml stool	Kit # 10
<i>Vibrio vulnificus</i>	Isolation of <i>V. vulnificus</i> from blood of ill persons.	Blood	Sterile Container

Table 10A. Criteria for confirmation of viral agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
Hepatitis A virus	28-30 days (15-50 days)	Acute febrile illness with anorexia, fever, abdominal discomfort, nausea, jaundice	Fecally contaminated cold foods or water, raw shellfish
Calicivirus ("Norwalk-like" or small round structured viruses)	24-48 hours (10-96 hours)	Nausea, vomiting (often projectile), diarrhea, abdominal cramps, muscle aches, headaches, low-grade fever	Fecally contaminated cold foods or water, oysters or clams, frostings

Table 11A. Criteria for confirmation of parasitic agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
<i>Cyclospora cayetanensis</i>	7 days (1-11 days)	Fatigue, protracted watery diarrhea, often relapsing	Fecally contaminated fruits, produce or water
<i>Cryptosporidium parvum</i>	7 days (2-12 days)	Profuse watery diarrhea, abdominal cramps, nausea, low-grade fever, anorexia, vomiting	Fecally contaminated fruits, produce or water
<i>Entamoeba histolytica</i>	2-4 weeks (few weeks - several months)	Illness of varying severity ranging from mild chronic diarrhea to fulminant dysentery	Fecally contaminated fruits, produce or water
<i>Giardia lamblia</i>	7-10 days (2-25 days)	Diarrhea, abdominal cramps, bloating, weight loss, malabsorption; infected persons may be asymptomatic	Fecally contaminated fruits, produce or water
<i>Trichinella spiralis</i>	8-15 days (5-45 days)	Initially diarrhea, nausea, vomiting, abdominal discomfort, muscle aches, edema of the eyelids; variable symptoms depending on the number of larvae ingested	Undercooked pork or bear meat

Table 10B. Criteria for confirmation of viral agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	WSLH Kit #
Hepatitis A virus	Positive anti-HAV IgM test, OR Liver function tests compatible with hepatitis in persons who ate the implicated food.	3 ml serum or 7ml vacutainer, no additives	Kit # 22
Calicivirus ("Norwalk-like" or small round structured viruses)	Diagnosed is often based on symptoms, onset times, and ruling out other enteric pathogens, OR Identification of virus in stool by polymerase chain reaction (PCR), OR Positive detection (Electron microscopy) of virus in vomitus or stool in ill persons or serology. (Only done with high risk groups in enclosed populations)	5-50 g raw stool in sterile container	Prior arrangements <u>must</u> be made through DOH and WSLH

Table 11B. Criteria for confirmation of parasitic agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	WSLH Kit #
<i>Cyclospora cayetanensis</i>	Demonstration of <i>C. cayetanensis</i> in stool of two or more ill persons.	Walnut-sized stool	Kit # 3 or 10% formalin
<i>Cryptosporidium parvum</i>	Isolation of <i>C. parvum</i> oocysts from implicated food, OR Isolation of <i>C. parvum</i> oocysts from stool of ill persons, OR Demonstration of <i>C. parvum</i> in intestinal fluid, or small bowel biopsy specimens, OR Demonstration of <i>C. parvum</i> antigen in stool by a specific immunodiagnostic test (e.g., enzyme-linked immunosorbent assay (ELISA)).	Walnut-sized stool	Kit # 3 or 10% formalin
<i>Entamoeba histolytica</i>	Isolation of <i>E. histolytica</i> from stool of ill persons, OR Demonstration of <i>E. histolytica</i> trophozoites in tissue biopsy, culture or histopathology	Walnut-sized stool	Kit # 3 or 10% formalin
<i>Giardia lamblia</i>	Isolation of <i>G. lamblia</i> cysts from implicated food or water, OR Isolation of <i>G. lamblia</i> from stool of ill persons, OR Demonstration of <i>G. lamblia</i> trophozoites in duodenal fluid or small bowel biopsy, OR Demonstration of <i>G. lamblia</i> antigen by specific immunodiagnostic test (e.g., direct fluorescent antigen (DFA)).	Walnut-sized stool	Kit # 3 or 10% formalin
<i>Trichinella spiralis</i>	Detection of <i>T. spiralis</i> from muscle biopsy from ill person, OR Fourfold change or positive serologic test, OR Demonstration of <i>T. spiralis</i> in implicated food, OR Associated cases are confirmed if patient ate epidemiologically linked meal and is clinically compatible.	Tissue or serum	Sterile container

Table 12A. Criteria for confirmation of other agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	Usually < 1 hour (5 minutes - 8 hours)	Compatible clinical syndrome - usually gastroenteritis with metallic taste	High acid foods/beverages stored or prepared in containers coated, lined, or contaminated with the offending metal
Scombroid fish poisoning	Usually < 1 hour (1 minute - 3 hours)	Flushing, headache, dizziness, burning of mouth and throat, upper and lower gastrointestinal symptoms, urticaria and generalized pruritis	Temperature abused fish (especially tuna, mahi-mahi, mackerel, bluefish)
Ciguatoxin	2-8 hours (1-48 hours)	Gastrointestinal symptoms followed by neurologic manifestations, including pricking or burning sensation of lips, tongue or extremities, reversal of hot/cold sensations	Fish (especially snapper, grouper, amberjack)
Paralytic shellfish poisoning (PSP)	30 minutes - 3 hours	First symptoms include tingling and numbness of lips and mouth, spreading to adjoining parts of face; symptoms vary depending on type, amount and retention of toxins in the body	Shellfish
Mushroom poisoning	6-24 hours (1-24 hours)	Initially nausea, vomiting, watery diarrhea which may progress to liver failure and death	Mushrooms (usually of the genus <i>Amanita</i>)
Monosodium glutamate poisoning	Usually < 1 hour (3 minutes - 2 hours)	Burning sensation in chest, neck, abdomen or extremities, sensations of lightness and pressure over face, or heavy feeling in the chest	Food containing large amounts of MSG (usually >1.5g)

Table 12B. Criteria for confirmation of other agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	WSLH Kit #
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	Demonstration of high concentrations of metallic ion in implicated food or beverage (e.g., >400 ppm for tin).	*	*
Scombroid fish poisoning	Demonstration of elevated histamine levels (>50mg/100g) in implicated fish, cheese, or other food, OR Clinical syndrome in persons known to have eaten fish of Order Scombroidei or types of fish previously associated with scombroid poisoning (e.g., mahi-mahi, tuna, bluefish).	*	*
Ciguatoxin	Demonstration of ciguatoxin in implicated fish, OR Clinical syndrome in persons who have eaten a type of fish previously associated with ciguatera poisoning (e.g., amberjack, snapper, grouper).	*	*
Paralytic shellfish poisoning (PSP)	Detection of toxin in implicated mollusks, OR Detection of large numbers of shellfish poisoning-associated species of dinoflagellates in water from which implicated mollusks were gathered.	*	*
Mushroom poisoning	Demonstration of toxic chemical in implicated mushrooms, OR Epidemiologically implicated mushrooms identified as toxic.	*	*
Monosodium glutamate poisoning	History of ingesting implicated foods containing large amounts of MSG (usually >1.5g).	*	*

* If an outbreak involves any of the agents listed on Table 4A/4B, immediately contact the DOH or WSLH and receive instructions as to which specimens to collect, how to transport these specimens and to which specialty laboratories they should be sent.